

ABSTRACT

A data network routing apparatus and method are presented. The routing apparatus comprises a packet engine, which itself comprises a switch, a forwarding engine and a queueing processor. The queueing processor tracks individual input port to output port flows, and assigns packets to these flows. Flows are assigned to queues. Each queue can accommodate a large number of packets. Each queue is assigned to a subclass, and a number of subclasses are assigned to a class. The apparatus and method thus support numerous differentiable classes of data as well as further differentiable subclasses within each class.

While queues within a given subclass are served with equal priority by the routing apparatus, each subclass can be assigned a different weight to differentiate the priority within a subclass. In turn, each class can be assigned a different weighting as well, to allow different treatment before reaching an output port. Thus, a wide spectrum of service differentiation is supported. When implemented in a high-speed integrated optical-electronic data network with near immediate restoration and rerouting capabilities, premium IP services can be offered with quality and service guaranteed even under the most extreme high-traffic and failure scenarios.